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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/740,542	12/18/2000	John H. Howard	5181-59700	8378

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EXAMINER

GEREZGIHER, YEMANE M

ART UNIT	PAPER NUMBER
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2144

DATE MAILED: 04/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/740,542

Applicant(s)

HOWARD ET AL.

Examiner

Yemane M Gerezgiher

Art Unit

2144

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5,7,8,9 and 10.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

1. This application has been examined. Claims 1-31 are pending.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 22, 24, 25 and ~~26~~ 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Xu et al (U.S. Patent Number 6,324,581) hereinafter referred to as Xu.

*As per claim 22 a computing node; and a low latency interconnect coupled to the computing node and to a storage, (See Figures 3 and 4, a client node interconnected with a storage device via a high speed fiber channel connection, Column 10, Lines 34-35) wherein the computing node is configured to directly access the storage via the low latency interconnect using a first file identifier identifying a file on storage. (See Figures 3 and 4, and Column 10, Lines 12-22, Xu disclosed a metadata server providing the requesting node with a file identifier to the file which was requested to be accessed by returning a metadata information including pointers pointing where the requested file was stored and which storage device was associated with the request and accessing*

Art Unit: 2144

the desired file from a data storage device containing the cashed data file where a client node configured to directly access a file from a storage device).

As per claim 24, *metadata server coupled to the low latency interconnect, wherein computing node is configured to generate a request to open a file, See Figures 3 & 4, Column 9, Line 59 through Column 10 Line 25) and wherein metadata server is coupled to receive request, (See Figures 3 & 4, Column 10, Lines 12-14, Xu disclosed a metadata server configured to receive a request for a file from a data storage) wherein metadata server is configured to provide at least first file identifier corresponding to file responsive to request, first file identifier identifying at least a portion of file within storage, and wherein computing node is coupled to receive first file identifier for directly accessing storage. (See Column 10, Lines 14-17, Xu disclosed a metadata server providing the requesting node with a file identifier to the file which was requested to be accesses by returning a metadata information including pointers pointing where the requested file was stored and which storage device was associated with the request and accessing the desired file from a data storage device containing the cashed data file)*

As per claim 25 and 27, *directly accessing a storage from a computing node coupled to the storage via a low latency interconnect, the directly accessing responsive to a first file identifier. (See Figures 3 and 4, Column 10, Lines 34-35 and Column 4, Lines 28-48, Xu disclosed a client node interconnected with a storage device directly accessing the storage device via a high-speed fiber channel connection and accessing file directly from the storage device based on a file identifier) generating a request to*

*open file from computing node; providing at least first file identifier corresponding to file from a metadata server responsive to generating request, first file identifier corresponding to file and identifying file within storage.* (See Column 5, Lines 1-12 where a request was generated from a first computing node in order to open a file from the storage in the file storage device by receiving a metadata from a metadata server/device specifying the device identification and the file identifier associated with the generated request from the client.)

As per claims 28-31, *a first computing node configured to directly access a storage with a first access command; a second computing node configured to directly access storage with a second access command concurrent with first computing node; and storage coupled to first computing node and second computing node* (See Figures 3 and 4 and Column 10, Lines 5-12, Xu disclosed two client nodes *concurrently* accessing a data storage directly using first access command and second access command and therein a storage device connected to both the first and second client node accessing data file from the data storage independent of the metadata server)

#### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al (U.S. Patent Number 6,324,581) in view of what would have been obvious to one of ordinary skill in the art at the time the invention was made.

As per claim 1, *a computing node configured to generate a request to open a file, wherein computing node is configured not to cache data from file; (See Figures 3 & 4, Column 9, Line 59 through Column 10 Line 25) and a metadata server coupled to receive request (See Figures 3 & 4, Column 10, Lines 12-14, Xu disclosed a metadata server configured to receive a request for a file from a data storage), wherein metadata server is configured to provide at least a first file identifier corresponding to file responsive to request, first file identifier identifying at least a portion of file within a storage storing file; wherein computing node is coupled to receive first file identifier for directly accessing storage. (See Column 10, Lines 14-17, Xu disclosed a metadata server providing the requesting node with a file identifier to the file which was requested to be accesses by returning a metadata information including pointers pointing where the requested file was stored and which storage device was associated with the request and accessing the desired file from a data storage device containing the cached data file).*

As per claims 2 and 3, *wherein metadata server and the computing node are further configured to provide a device identifier indicative of storage responsive to request. (See Column 4, Lines 5-7, Xu disclosed a server computer returning a*

Art Unit: 2144

metadata of a file including information identifying the storage locations of the data storage storing the file)

As per claim 4, *wherein metadata server is configured to assign an access key to request.* (See Column 4, Lines 9-15, Xu disclosed a metadata server using a metadata of a file to produce a data access command key to access the data from the data storage)

As per claims 5 and 6, *wherein computing node is coupled to receive access key, and wherein computing node is configured to transmit access key with an access command to storage.* See Figures 3-5 and ABSTRACT, Xu disclosed a client node interconnected to receive access file id and device location id and accessing a storage device directly by transmitting the access information to the storage device and where the storage was coupled to receive a metadata comprising an access key from the metadata server (claim 6). Xu disclosed a *computing node been configured to transmit an access command to storage to close file*, and where the command close was communicated among all the client node, the metadata server and the storage device (claims 7 and 14). See Figures 7-10, Column 17, Line 35 through Column 18, Line 44.

As per claim 8, *wherein request includes a file name of file.* (See Column 4, Lines 25-48, Xu disclosed a request to access data file containing a specified file)

As per claim 9, *wherein metadata server includes a directory, and wherein directory maps file name to first file identifier.* (See Column 2, Lines 9-50, Column 3,

Lines 44-58 and Column 8, Lines 41-55, Xu disclosed a metadata server comprising a directory mapping requested files by the client node)

As per claims 10 and 21, *wherein computing node is configured to transmit an access command to storage to access one or more bytes, and wherein a number of one or more bytes affected by access command is not equal to a block size of storage.* See Column 17, Lines 35-67, Xu disclosed a client node transmitting an access command to a storage device and accessing a byte or more using a file offset technique instead of reading the whole block size in read and write operations.

As per claims 11-13, *comprising storage and an interconnect, wherein computing node, metadata server, and storage are each coupled directly to interconnect.* (See Column 10, Lines 31-38, Xu disclosed the storage device a metadata server and the request initiating node interconnected by a high-speed where the computing node configured to directly access the storage device connected to the client node via the low latency interconnect (claim 13) and where the client node was configured to request for a file through the fiber optic channel to the metadata server and receiving a file id along with a storage device identification from the metadata server (claim 12). See Figures 3 and 4 and Column 9, Line 59 through Column 10 Line 25.

As per claims 15, 18 and 19, *generating a request to open a file from a computing node;* (See Figures 3, 4 and 5, Column 4, Lines 56-58 and Column 11, Lines 2-5, Xu disclosed a client generating a request to access a file from a file server having a metadata information about a storage devices) *providing at least a first file identifier*



Art Unit: 2144

*corresponding to file from a metadata server responsive to generating request, first file identifier corresponding to file and identifying file within a storage storing at least a portion of file; (See Column 4, Lines 20-48) and directly accessing storage from computing node responsive to first file identifier, wherein computing node is configured not to cache data from file. (See Column 10, Lines 14-17, Xu disclosed a metadata server providing the requesting node with a file identifier to the file which was requested to be accessed by returning a metadata information including pointers pointing where the requested file was stored and which storage device was associated with the request and accessing the desired file from a data storage device containing the cached data file where assigning the access was in response to a request received from a computing node and transmitting access key from computing node to storage with an access command for storage (claims 18 and 19). See Column 10, Lines 1-25 and Figures 3-5.*

*As per claims 16 and 17, providing a device identifier identifying storage from metadata server responsive to generating request. (See Column 4, Lines 5-7, Xu disclosed a metadata of the file requested including a data storage device identifying the location in the data storage system) and routing an access from computing node directly to storage using device identifier (See Figures 3 and 4 and Column 4, Lines 1-60)*

*As per claim 20, validating access key from computing node using access key from metadata server. (See Column 1, Lines 20-31, Column 4, Lines 22-25 and Column 40, Lines 51-65, Xu disclosed checking an access key request received from a client at the metadata server).*

Xu substantially disclosed the invention as claimed. However, Xu was silent regarding the client node *been configured not to cache a file*. However, caching at the client side was very well known in the art at the time the invention was made. Having said that, the omission of undesired feature is an obvious variation of a defined invention. See MPEP 2144.4(II)(a). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to avoid caching at the client node and modify the teachings of Xu related to client network having a direct access to a storage device using a high-speed fiber channel and access a specific portion of a file from the cached data in the file storage, because such a modification would eliminate the need of caching at the client node.

6. Claims 23 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al (U.S. Patent Number 6,324,581) as applied to claims 22 and 25 above in view of Gregg et al (U.S. Patent Number 6,442,613) hereinafter referred to as Gregg.

As per claims 23 and 26, *wherein the low latency interconnect has a typical latency less than 100 microseconds*. (See Figures 3 and 4, a client node interconnected with a storage device via a high-speed fiber channel connection, Column 10, Lines 34-35). Although it is very well known in the art that a fiber optic interconnection to have very low latency, Xu did not explicitly disclose the low latency interconnect to have a typical latency less than 100 microseconds.

An artisan working with Xu's invention at the time the invention was made would have been aware about the fact that a fiber channel has a low latency less than 100 microseconds or else would have been motivated to look for teachings that may have allowed to use an interconnect with a low latency. In these arts Gregg taught a fiber optic channel having a low latency less than 100 microseconds. See Column 1, Lines 48-56 and Column 8, Lines 13-23.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to take the specific fact of a fiber optic channel taught by Gregg and have realized that the use fiber optic channel would facilitate to achieve a low latency less than a 100 microseconds.

### *Conclusion*

7. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

- a. Kumar, Subbarao Ravi (U.S. Patent Number 6,651,140) Entitled: *Caching pattern and method for caching in an object-oriented programming environment*
- b. Shomler, Robert Wesley (U.S. Patent Number 6,567,853) Entitled: *Scalable I/O system for the efficient transfer of storage device data by a non-server reconnection*

- c. Soltis, Steven R. et al. (U.S. Patent Number 6,493,804) Entitled: *Global file system and data storage device locks*
- d. Jiang, Xiaoye et al. (U.S. Patent Number 6,453,354) Entitled: *File server system using connection-oriented protocol and sharing data sets among data movers*
- e. Vahalia, Uresh K. et al. (U.S. Patent Number 6,389,420) Entitled: *File manager providing distributed locking and metadata management for shared data access by clients relinquishing locks after time period expiration*
- f. Bostian, Laura Margaret et al (U.S. Patent Number 6,339,793) Entitled: *Read/write data sharing of DASD data, including byte file system data, in a cluster of multiple data processing systems*
- g. Loaiza, Juan R. et al. (U.S. Patent Number 6,012,060) Entitled: *Sharing, updating data blocks among multiple nodes in a distributed system*
- h. Ali, Seifu et al. (U.S. Patent Number 5,940,594) Entitled: *Distributed storage management system having a cache server and method therefor*
- i. Vahalia, Uresh K et al. (U.S. Patent Number 5,893,140) Entitled: *File server having a file system cache and protocol for truly safe asynchronous writes*
- j. Irwin, Jr., Basil L. et al. (U.S. Patent Number 5,566,331) Entitled: *Mass storage system for file-systems*

Art Unit: 2144

NON PATENT DOCUMENTS

- a. H. Gobioff et al, "*Security for Network Attached Storage Devices*", White Paper CMU-CS-97-185, October 1997

8. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Yemane Gerezgiher whose telephone number is 703-305-4874. The examiner can normally be reached on Monday- Friday from 9:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful. The examiner's supervisor, William Cuchlinski, can be reached at (703) 308-3873.

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